"EVERY SEEDLING FROM SELECTED SEED"

by

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In progress now is the largest planting of trees from selected seed ever made in this country. By the end of this planting season West Virginia Pulp and Paper Company will have planted 13,000,000 loblolly and slash pine seedlings - all produced from seed from selected trees. Most of the seed was collected from seed collection areas in plus stands. However, because we expected a poor cone crop this year, it was necessary to collect a two year seed supply last fall. Seed collection areas scheduled for cutting could not supply all of this so some cones were collected from seed trees in reproduction stands - but still from selected trees, The seedlings have been grown for us by the South Carolina State Nursery. Collection of slash and loblolly seed only from selected trees is now established policy. The principle has also been extended to Atlantic white cedar where seed collection areas produce the same benefits as in pine: desirable parentage, abundant and large cones, and large seed of high viability.

We consider seed selection a big step forward in forest management. However, we know that there are all degrees of "selection" of trees and seed. Much more rigid selection than that applied in seed collection areas is possible, so we have really only taken the first step in tree improvement. The next step is to produce seedlings from orchards of rigidly selected clones. To this end the process of selecting and testing superior trees has begun and we have been keeping abreast of the techniques of vegetative propagation. In May, Mr. Easley reported to the tree improvement committee that the results of our first serious attempt at grafting indicated about 40% success. Subsequent losses reduced this to 10%, so we still have much to learn about grafting. With the assistance and guidance of the North Carolina State College Tree Improvement Project, we plan to get started on a grafted loblolly pine seed orchard this year.

Even seed orchards of rigidly selected clones are only considered an intermediate application of genetics to forestry. A further application, perhaps the ultimate, is breeding for specific characteristics. This objective has been pursued in a limited program of controlled pollination since February, 1954. Several hybrids within species and between species are now one year old. The characteristics of one cross are distinct enough to report. Slash pollen

on longleaf strobili produced 24 seedlings of which 15 have stems from 1' to 4" long. The other 9 are still in grass stage. Most needles are as long as longleaf but are more delicate than either slash or longleaf. The most successful interspecies hybrid in terms of number of cones successfully pollinated and seedlings produced was loblolly pollen on pond pine. We hope to combine the site adaptability of the pond pine and the form and growth of loblolly for planting in the Pocosin country of Eastern North Carolina. Of course the evaluation of the useful properties of these hybrids will take many years. This is all the more reason for beginning now.

The first major step in the evolution of forest genetics has been accomplished by collecting seed only from selected trees. It would be wasteful to lose the potential in this seed through mediocre nursery practice. The higher value of seed from orchards in years to come will make it even more imperative to get as many plantable seedlings as possible from every bushel of cones. This need to make the best use of seed was an important factor in West Virginia's decision to build its own nursery. Beginning with the sowing this spring we will be able to give select seed the care it deserves.

It has been demonstrated that the harvesting of well ripened cones and careful extraction can produce twice the yield of seed per bushel as is commonly obtained, and at no extra cost. Viability of seed from collection areas has been found to be in the neighborhood of 50% above average. Thus, application of present knowledge can yield three times the number of plantable seedlings per bushel of cones obtained under common practice. Probably lighter sowing in the nursery would result in fewer culls. The seed resource can probably be stretched even further by dividing the seed into several sizes. Small seeds produce seedlings which cannot compete with the larger seedlings in the nursery bed, but in all other respects they are just as good. By sorting seed into several sizes and planting each separately a larger proportion of the seed should produce plantable seedlings.

Recently one lot of seed was divided into three sizes on a crippen, 3 screen, seed cleaner. The small seed contained 23,600 per pound, medium seed 19,300 per pound, large seed 16,300 per pound. Of the total number of seeds, 29% were small, medium 55% and large 16%. The optimum breakdown is not known and will have to be determined by experiment. The number of seeds per pound and the screen sizes used to get this breakdown will probably vary from year to year with the quality of the seed crop. These figures are cited only as an example of the type of size breakdown that can be obtained.

How much genetic improvement can we expect from selected seed? It is impossible to know, of course, but one guide is suggested. We are all familiar with the deterioration of a stand after a high-grading cut. The standards of selection used in our seed collection areas are such that the practice should be considerably more eugenic than high-grading is disgenic. The pendulum of genetic quality is probably swinging back more than halfway. As one who only a few years ago scoffed at the idea of applying genetic principles to forestry, to me this seems like great progress.